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Aerotropism.—POLOWZOW has taken up the question of the response of plant organs to gases.²¹ Reserving the usual term aerotropism for sensitiveness to the mixture of gases that compose the air, he proposes the term *aeroidotropism* for sensitiveness to pure gases. This seems an unnecessary refinement of terms. Very properly he criticizes the use of roots as subjects for experiments with gases, since the organ is under wholly unnatural conditions, and uses stems, which SAMMET tried with negative results. POLOWZOW finds *Brassica Napus*, *B. Rapa*, *Vicia sativa*, *V. Faba*, *Pisum sativum*, *Lupinus albus*, *Phaseolus multiflorus*, and *Helianthus annuus* sensitive to O_2 and CO_2 , but unaffected by H and N_2 . The grasses studied were all indifferent. At the beginning there is a positive curvature, which becomes more rapid, slows, ceases; shortly a negative curvature sets in, gradually increasing. When stimulation ceases, curvature slows, stops, and then the recovery of the normal position takes place. The active region may be a centimeter or more distant from the perceptive region, which may even be in the part of the stem that has ceased growing, showing that perceptive capacity persists longer than capacity for the curvature reaction. The perception time was found to be 0.5 sec. with 0.01% of CO_2 and periods of stimulation and rest in the ratio 1:3. The reaction time was found to be not much more than in various tactual responses; POLOWZOW thinks because the movements in both cases were examined by the microscope, and he pleads for the use of the more refined methods of the animal physiologists. There is certainly nothing to prevent; BOSE has blazed the path. We hope that in the full paper to which this is preliminary the author will give us such records and discuss more fully some general questions he raises.—C. R. B.

Seed production in Pinus.—Under this title HAYDON²² presents the results of an extended field study supplemented by cytological work. The cytological conditions found in both microsporangiate and megasporangiate cones at various seasons are noted in detail. The staminate cone, in the vicinity of Liverpool, passes the winter in the spore mother cell stage. The megaspore mother cell appears about the end of May, but its origin was not determined. Occasionally large ventral canal cells are formed, and in a few cases the first mitosis in the egg was observed when there were no traces of pollen tubes or other evidences of fertilization. HAYDON believes this supports the suggestion of the reviewer²³ that a large ventral canal nucleus might fertilize the egg. The simultaneous divisions at the base of the egg by which the proembryo passes from the 8-celled stage to the 12-celled stage is sometimes in the lower tier instead of in the upper tier, as is usually the case. Theoretically, the ovulate cone might produce some

²¹ POLOWZOW, W., Experimentelle Untersuchungen über die Reizerscheinungen der Pflanzen, mit besonderer Berücksichtigung der Einwirkung von Gasen. Vorläufige Mitteilung. Ber. Deutsch. Bot. Gesells. **26a**:50-69. 1908.

²² HAYDON, WALTER T., The seed production of *Pinus sylvestris*. (Inaugural address.) Proc. and Trans. Liverpool Biol. Soc. **22**:1-32. figs. 16. 1907.

²³ BOT. GAZETTE. **42**:349. 1906.

1500 proembryos, but actually it produces only 10 to 20 seeds. The factors responsible for the difference between the theoretical and the actual output are considered, both in the field study and in the cytological work.—CHARLES J. CHAMBERLAIN.

Geotropic curvature.—PORODKO, reinvestigating the statement of KOHL that “the geotropic curvature extends also to parts of the stem in which growth can no longer be demonstrated,” comes to the contrary conclusion, though he does not discover the source of KOHL’s error, unless in the fact that he did not use the microscope in his measurements.²⁴

BACH’S conclusion that the presentation and reaction times for geotropic curvatures are not affected by shaking and jarring, has been welcomed by opponents of the statolith theory of geoperception as depriving it of an important support, though BACH himself does not so use his data. HABERLANDT, whose experiments in shaking and jarring led him to quite the opposite conclusion, reexamines BACH’S data, criticizes his methods somewhat, and interprets some of his experiments as showing the very thing which BACH thought they did not show.²⁵ HABERLANDT also pays his compliments to LINSBAUER, who raised a theoretical objection to the value of the jarring experiments. The statolith theory has a watchful champion, ready to meet all comers.—C. R. B.

A lycopod with a seedlike structure.—MISS BENSON’S abstract of her paper on *Miadesmia* was noticed in this journal.²⁶ The full paper has now appeared,²⁷ and the fuller description and plates make the situation more evident. The discovery of the sporophylls of this minute, herbaceous, paleozoic lycopod, has shown a clear relationship to the ligulate Lycopodiaceae, especially *Selaginella*. The megasporangium produces a single, thin-walled spore, which germinates *in situ*. An integument is developed around the sporangium, leaving a micropyle; and from the surface of the integument numerous long processes develop, giving quite a fringed look to the apparatus. At maturity the sporophyll is shed, the whole structure resembling a winged and fringed seed. The relation of this “integument” to the “velum” of other groups is vague and apparently hardly worth considering; but another case of integumented sporangium, to be added to the previously described *Lepidocarpon*, is quite worth while.—J. M. C.

Dwarf male prothallia.—BOODLE²⁸ has observed that if *Todea Fraseri*, a filmy species, be kept in a sufficiently damp atmosphere, the sporangia do not

²⁴ PORODKO, T., Nimmt die ausgewachsene Region des orthotropen Stengels an der geotropischen Krümmung teil? Ber. Deutsch. Bot. Gesells. **26a**:3-14. 1908.

²⁵ HABERLANDT, G., Ueber die Einfluss des Schüttelns auf die Perception des geotropischen Reizes. Ber. Deutsch. Bot. Gesells. **26a**:22-28. 1908.

²⁶ BOT. GAZETTE **44**:318. 1907.

²⁷ BENSON, MARGARET *Miadesmia membranacea* Bertrand; a new palaeozoic lycopod with a seed-like structure. Phil. Trans. Roy. Soc. London B. **199**:409-425. pls. 33-37. 1908.

²⁸ BOODLE, L. A., On the production of dwarf male prothalli in sporangia of *Todea*. Annals of Botany **22**:231-243. pl. 16. 1908.